of the white-tailed guereza, of a Peking stag, of Père David's Mi-Lou deer, and of the giant tortoise of South Aldabra Island. We hope that this book, which is as stimulating as it is informative, and is far and away above most "popular" natural history essays in its thoroughness, accuracy, and suggestiveness, will have the wide circulation it deserves, and that the author will continue to enrich our scientific literature with many more "zoological essays."

J. A. T.

## INFECTION AND IMMUNITY.

*Infection and Immunity, with Special Reference to the Prevention of Infectious Diseases.* By George M. Sternberg, M.D., LL.D., Surgeon-General U.S. Army (Retired). Progressive Science Series. Pp. ix+293. (London: John Murray, 1903.) Price 6*s.* net.

IN the preface to this volume we find the general statement that "all infectious diseases are preventable diseases," and with this proposition, at least in a general sense, we heartily concur. It follows that there can be no more important factor in the extermination of infectious diseases than the education of the public in their essential nature and modes of spread. For with such knowledge comes not only increased personal precaution against infection, but what is even more important, an enlightened tolerance of sanitary legislation. A volume on "infection and immunity" is thus most suitable for such an undertaking as the Progressive Science Series, and the editor has been fortunate in securing the services of Dr. George M. Sternberg as an expositor of the subject. Dr. Sternberg is well known as one of the pioneers of American bacteriology; he has taken a prominent part in the advancement of public health, and, in particular, of military hygiene in that country; disinfection is, moreover, one of the subjects with which his name is especially associated.

As befits the series to which it belongs, the book is written for the non-medical public, and the writer expresses the hope that it may serve as a text-book for those responsible for the sanitary welfare of public institutions, and even for high schools and colleges. It is divided into two parts, the first of which deals with the general principles of the subject, while the second is devoted to the chief infectious diseases in detail.

The general part contains thirteen short chapters. After a definition and explanation of what is meant by infectious disease, the nature of "disease germs" receives somewhat short treatment. The chapter on "channels of infection" is excellent, and gives a clear idea of the ways in which different diseases spread. Equally good is the chapter on susceptibility to infection, and this is followed by a series of chapters on disinfection and the different agents by which this can be brought about, such as heat, chemicals, and the like. The action of these agents is clearly explained. This part of the book is brought to a close by three short chapters on immunity and antitoxins. The author is probably wise in having omitted, in a popular work, all discussion of Ehrlich's fascinating theory of the origin of "anti-bodies."

It appears to us that Dr. Sternberg has done this part of his work well, and has furnished a very adequate and readable account of the subject, but it is permissible to doubt whether, in his effort to be concise, he has always made sufficient allowance for the extraordinary ignorance which undoubtedly exists in the mind of the average man as to the essential nature of bacteria and other disease germs. He deals with this matter, which it must be remembered lies at the very root of his whole subject, in five short pages, in which we fail to find any reference whatever to the size of the objects he is describing. Yet it is this very matter of size which is so great a stumbling-block to the average mind in forming a conception of the nature of infection. It would, in our opinion, have been well, in a book which is intended as a text-book for students in high schools and colleges, to have devoted a much larger space to elementary information as to the essential nature of disease germs. In spite of the great accuracy which marks the majority of the writer's statements, there are one or two to which it is possible to take exception. On p. 12 we read that "tetanus is the only disease of man in which spores have been demonstrated"; there are other anaërobic sporeformers which produce disease in man, *e.g. Bacillus oedematis maligni* and *B. aërogenes capsulatus*, while anthrax is unfortunately far from unknown as a human affection. Again, on p. 41, it is stated that alcohol has scarcely any germicidal power; it is true that alcohol cannot kill bacterial spores, but it is almost instantaneously fatal to non-sporing bacteria, at least when these are in the moist condition. These, however, are small blemishes upon what is, on the whole, a very excellent account of a difficult and complex subject.

When we turn from the general to the special part of the book, which occupies another twenty chapters, it is difficult to find anything which is not worthy of unstinted praise. The different infections are taken seriatim, and under each disease we find an admirable and lucid account of its epidemiology and history, of what is known as to the germ which causes it, of the channels by which it spreads, and of the precautions to be taken in combating it. The only important human infectious disease which is omitted is anthrax, if we except syphilis and gonorrhœa, which, from motives of, we think, mistaken delicacy, have been altogether excluded from the book. The author naturally draws much of his statistical information from American sources, and some of it will probably be novel to English readers; for instance, the striking connection between toy pistols and tetanus which has been observed in the United States. The typhoid statistics of American cities will also be viewed with a chastened satisfaction in view of our own more favourable figures, save only for Belfast. It may be regretted that, in treating of diphtheria, Dr. Sternberg has not laid more stress on the importance of

bacteriological examination of the throat and nose in convalescents and in mild sore throats associated with diphtheria epidemics, since there can be little doubt that this is one of the most important sources of danger in the spread of the disease. We note also the unaccountable omission of bleaching powder as a disinfectant for tuberculous sputum; this substance, on account of its solvent powers on mucus, is now well recognised as far superior to any other chemical disinfectant for the purpose.

Those who are acquainted with the Progressive Science Series will be prepared to find the book well printed and got up. The illustrations are few in number, but fairly good, if we except a poor figure of the diphtheria bacillus on p. 193. There is an excellent index.

## PHYSIOLOGICAL CHEMISTRY.

*Practical Physiological Chemistry.* By Dr. J. A. Milroy and Prof. T. H. Milroy. Pp. viii + 201; interleaved. (Edinburgh and London: William Green and Sons, 1904.)

*A Laboratory Manual of Physiological and Pathological Chemistry for Students of Medicine.* By Prof. E. Salkowski. Translated from the second German edition by Prof. W. R. Orndorff. Pp. ix + 263; with ten figures and a coloured plate of absorption spectra. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1904.) Price 10*s.* 6*d.* net.

THE first work under notice is divided into two main portions, the first qualitative, the second quantitative, and the subjects of chemico-physiological interest are treated in a thoroughly practical and systematic manner. The book is written by those who have the necessary knowledge of both chemistry and physiology combined with experience in teaching. The result is a book which can be warmly recommended, and one which is perfectly trustworthy and free from error. It probably includes more than is usually done by students in a practical class with only a limited time at their disposal. It will be necessary for the judicious teacher to select the portions which he regards as essential; the large number of exercises will render this in one sense easy, though in some cases we see there may be a difficulty in choosing what shall be omitted where all is so excellent and so clearly explained. A few plates of important pieces of apparatus, of certain crystals and of absorption spectra are appended. We could have wished to see rather more illustrations of this kind, but this minor defect can be remedied in future editions.

Prof. Salkowski's name is a guarantee in itself that the student of physiological chemistry cannot fail to find much that is excellent and useful in any work he may write, and there is no doubt that this manual, either in the original German or in the present English translation, should find its place on the shelves of any well equipped physiological laboratory. There are certain methods of investigation which Prof. Salkowski has elaborated, and others at which he has particularly worked, some of a complicated nature not usually found in text-books of this kind; it is these which the advanced student or the investigator will find best treated in the present volume.

We cannot say that we think the book well suited for students' class work. This is no doubt largely due to the difference between German and English methods of teaching. The systematic practical class which forms such an important feature in the medical schools of Great Britain and America is almost unknown in Germany. There each student works independently in the laboratory at times and for periods which best suit him; he is left to worry out the problems very largely by himself. For the first-rate man this is a first-rate method, but the main bulk of the students do not receive such a thorough grounding as under the English system. The book is far too elaborate for the average student, though not complete enough in all directions for those engaged in original research. The worst fault of the manual is its want of system, and no doubt this arises from the German method or want of method just alluded to. This was particularly striking as we had previously been reading the book by Prof. Milroy and his brother. In this book the rational method is adopted of describing first the detection of the elements in an organic substance, then follow chapters on the three main classes of physiological compounds, carbohydrates, fats and proteids; from this we pass by natural sequence to the foods, the digestive fluids, the excretions and so forth. Prof. Salkowski, on the other hand, starts with the examination of milk, and treats the properties of the proteids as a sort of appendix to the study of that fluid, although the principal proteid of milk is by no means a typical one. Next follows a chapter on muscular tissue, a complex subject for a student only just starting work. A study of gastric juice succeeds this, and a chapter on the blood is sandwiched between that and the study of saliva. The pancreas, the bile, the urine, the liver, bone, fat and egg follow in the order named. Exactly the same thing is seen in each individual chapter; thus in that on the quantitative analysis of urine, we find several methods given for estimating urea, but instead of all coming together, they are separated by sections dealing with the estimation of uric acid and creatinine. We notice also that the book is not thoroughly up to date; this has been remedied in some cases by additions made by the translator, but in other cases, notably in the chapter on muscle, this has not been done. The translation has been well carried out, and Prof. Orndorff has done wisely in omitting the very large portion of the original work which deals with inorganic chemistry.

It is quite right that a translation of Prof. Salkowski's book should have appeared; it is a book with a deservedly high reputation, and has much to recommend it; our criticisms are mainly directed to show that it is not suitable for the average student of medicine on account of the manner in which the subjects are presented to him.